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(51) INT CL<sup>6</sup>

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(52) UK CL (Edition O )

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(56) Documents Cited

**GB 2294597 A**

**GB 2286728 A**

**GB 2262396 A**

**GB 2251984 A**

**GB 1526814 A**

**WO 92/11668 A1**

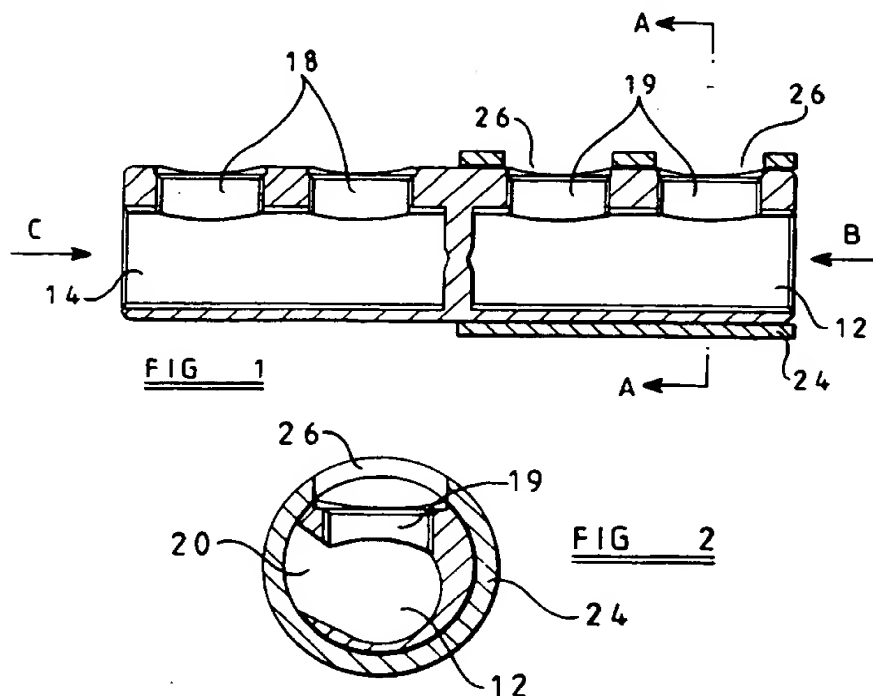
(58) Field of Search

**UK CL (Edition O ) H2E EEGF EEKD EEKE EEKH EEZ**

**INT CL<sup>6</sup> H01R**

## (54) Electrical connector

(57) An electrical connector for the connection of two or more electrical conductors comprises a plurality of sockets (12,14), each of which receives an end of a conductor. One of the sockets comprises a tubular member (12) with a longitudinal slot (20) through which the end portion of a conductor may be inserted laterally. A sleeve member (24) fits around the tubular member (12), the tubular member (12) and the sleeve member (24) having corresponding apertures (19,26) for receiving a locking bolt to secure the conductor.



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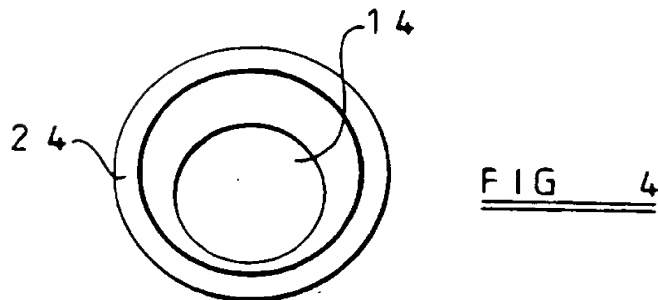
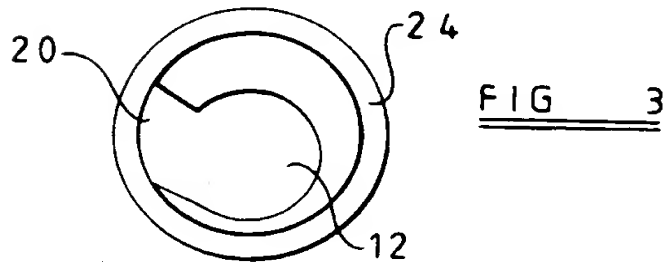
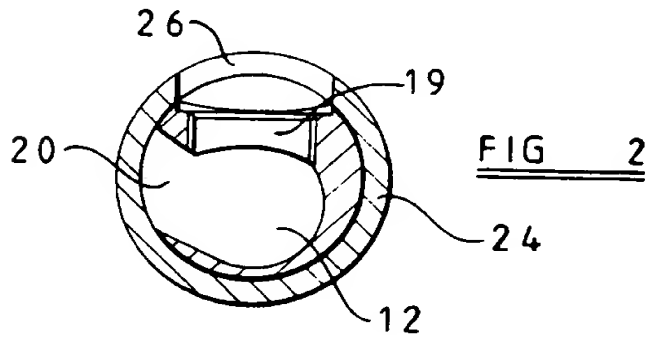
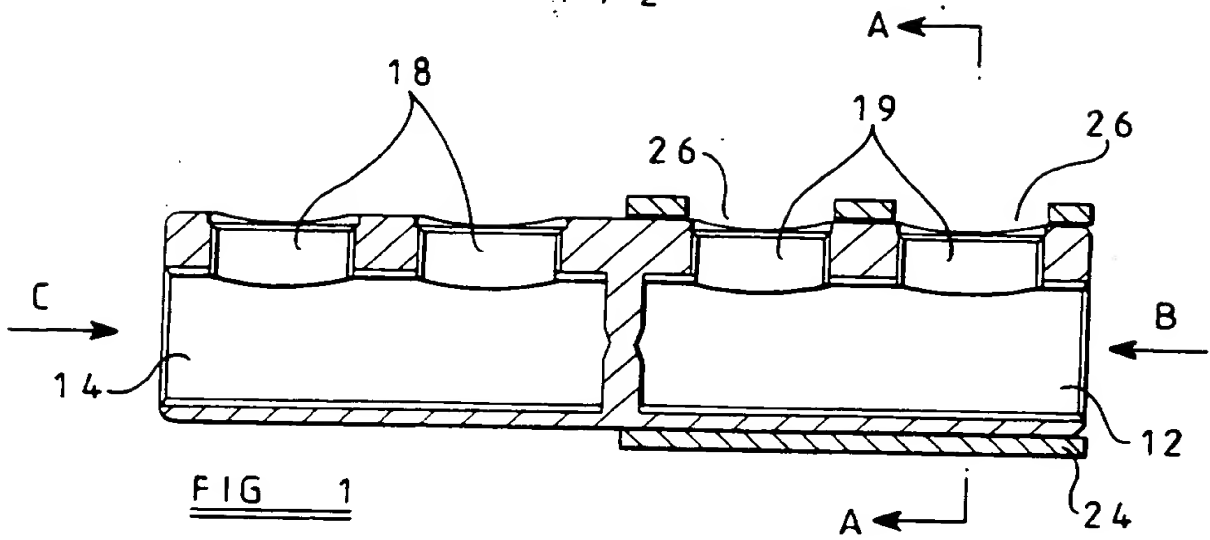


FIG 5

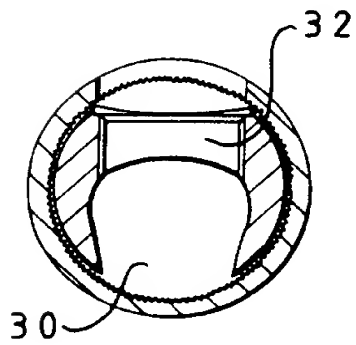
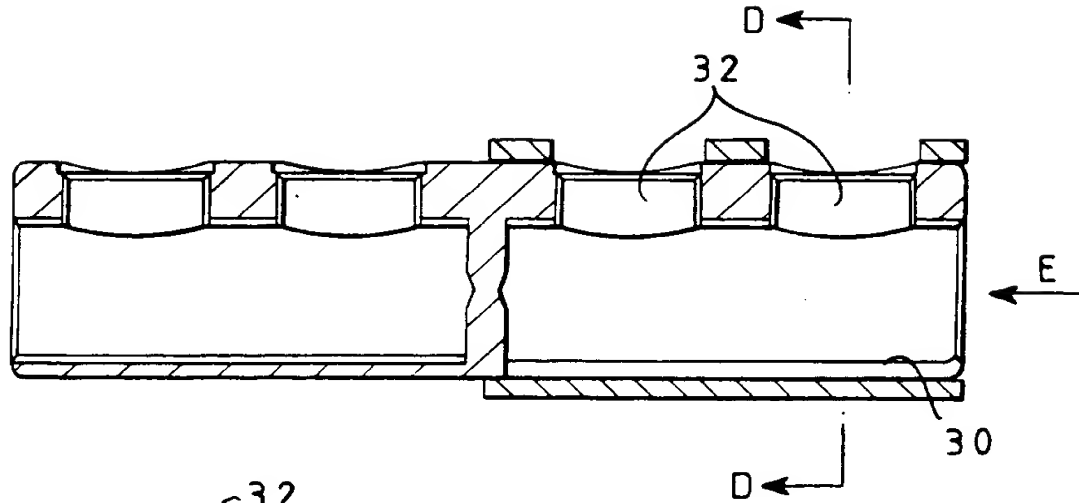


FIG 6

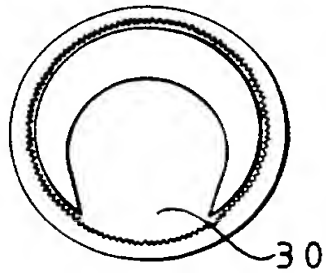


FIG 7

Title: Electrical Connector

This invention relates to a connector for use with electrical cables.

Cable connectors are used frequently in the electrical field for electrically connecting or terminating lengths of cables. Cable connectors can be used for any size of cable, but with those that are presently available (which typically comprise a generally cylindrical body with a bore at each end into which the cable ends are inserted) it is difficult to manipulate relatively large diameter cables into position because the cables are not flexible enough.

This problem is particularly acute when, as is most commonly the case, such connectors are used when the cables are already in position. As a result, the connectors must be inserted between the juxtaposed ends of the cables. Consequently, a great deal of effort is required to manoeuvre and manipulate the cables into both ends of a connector. Alternatively, a greater length of cable must be freed to enable the joint to be made than would otherwise be desired.

GB patent 2251984B discloses a connector including a socket in the form of an open channel into which the end of an inflexible conductor can be laid. A cover is then fitted over the channel to enclose the conductor and a sleeve, which has previously been slipped over the conductor, is fitted around the channel and cover to hold the assembly together. The cover and sleeve have apertures which constitute threaded bores with which locking bolts can be engaged to secure the conductor.

Although the connector disclosed in GB 2251984B is effective and facilitates the connection of inflexible connectors, it does suffer from the disadvantage that there are a relatively large number of components. This increases the manufacturing costs and also leads to the possibility of parts being mislaid.

There has now been devised an electrical connector which overcomes or substantially mitigates the above-mentioned disadvantage.

According to the invention, there is provided an electrical connector for the connection of two or more electrical conductors, the connector having a plurality of sockets, each of said sockets being adapted to receive an end of an electrical conductor, at least one of said sockets comprising a tubular member having a longitudinal slot through which the end portion of the conductor may be inserted laterally, and a sleeve member fitting, in use, around the tubular member, the tubular member and the sleeve member having corresponding apertures, an aperture in the tubular member and/or an aperture in the sleeve member being threaded so as to constitute a threaded bore with which a locking bolt may be engaged for securing the end portion of the electrical conductor to the tubular member or the sleeve member.

The connector according to the invention is advantageous primarily in that it facilitates the connection of cables, especially relatively inflexible cables. The length of cable which must be freed to enable a joint to be made may be less than is the case with conventional connectors. Compared with known sleeved connectors, the connector of the invention comprises relatively few components, and may therefore be cheaper to manufacture and simpler to use.

The connector according to the invention will be provided with a number of sockets corresponding to the number of cables to be connected. Generally, only one of the sockets need be of the form described, ie comprising the tubular member with the slot, and the sleeve member. The other sockets are preferably of generally conventional form, ie comprising a tube with one or more threaded bores through which extend locking bolts. In use, the connector is connected first to one or more conductors using the conventional sockets, the socket comprising the tubular member with slot then being used for connection to a further conductor.

Most commonly, the connector comprises two or three sockets.

When the connector comprises two sockets, one constructed in accordance with the invention and one being of conventional form, the two sockets are preferably co-axial. In such a case, the sleeve member may be sufficiently large to be withdrawn over the conventional socket before the conductor is introduced through the lateral slot. Alternatively, the external shape of the sleeve member may be substantially the same as the external shape of the conventional socket

so that the external surface of the assembled connector is substantially smooth. In this arrangement, the sleeve member must be passed over the end of the conductor before the latter is inserted into the longitudinal slot.

Referring once again to the socket constructed in accordance with the present invention, the threaded bore(s) are preferably provided only in the tubular member (which may be relatively thick walled), the aperture(s) in the sleeve member being plain and the sleeve member serving only to retain the conductor within the socket.

The tubular member is preferably part-cylindrical, the wall of the cylinder defining a slot wide enough to accommodate the largest conductor for which the connector is designed.

The slot may be formed in the wall of the tubular member at a position diametrically opposite to the aperture which receives the locking bolt. In such a case, when the sleeve is positioned around the tubular member, the locking bolt secures the conductor to the internal surface of the sleeve member. However, it is preferred that the slot be formed in the wall of the tubular member at a position sufficiently displaced from the axis of the locking bolt such that the bolt urges the conductor against an internal wall portion of the tubular member. The surface of the tubular member or the sleeve member to which the conductor is clamped by the locking bolt may be provided with teeth or similar formations to penetrate the surface of the conductor, and thereby improve the electrical connection.

After introduction of the conductor through the longitudinal slot, the slot may be closed by a suitable closure or plug. Such a plug may be of any suitable material, eg metal or plastics.

The connector according to the invention may be manufactured from any of the materials commonly used for the manufacture of conventional connectors. In general, any materials having the requisite mechanical strength and providing the necessary electrical connection may be used.

According to a second aspect of the present invention, there is provided a method of connecting



an electrical conductor to a connector as defined above, which method comprises

inserting the end portion of the conductor laterally through the slot in the tubular member,

positioning the sleeve member around the tubular member,

locating a locking bolt in the threaded bore constituted by the apertures in the tubular member and/or the sleeve member, and

tightening the locking bolt so as to secure the end of the conductor to the tubular member or the sleeve member.

The invention will now be described in more detail, by way of example only, with reference to the accompanying drawings in which

Figure 1 is a sectional side view of a first embodiment of an electrical connector according to the invention,

Figure 2 is a sectional view along the line A-A in Figure 1,

Figure 3 is an end elevation along the arrow B in Figure 1,

Figure 4 is an end elevation along the arrow C in Figure 1,

Figure 5 is a view similar to Figure 1 of a second embodiment of an electrical connector according to the invention,

Figure 6 is a sectional view along the line D-D in Figure 5, and

Figure 7 is a view along the arrow E in Figure 5.

Referring first to Figures 1 to 4, a first embodiment of an electrical connector according to the invention comprises coaxial first and second sockets 12,14. The second socket 14 is of tubular configuration, having a blind bore which in use receives an end of a cable (not shown), and includes two threaded apertures 18 into which bolts (not shown) are screwed to clamp the cable end in position.

The first socket 12 is of generally similar form, save that it is of part-cylindrical configuration, a slot 20 being formed in one side. Again, there are two threaded apertures 19 which, in use, receive locking bolts to clamp the end of another cable (not shown) to the lower internal surface of the first socket 12.

A tubular sleeve 24 fits around the first socket 12. The sleeve 24 is provided with two plain apertures 26, corresponding in position to the apertures 19 in the first socket 12, and through which locking bolts may be passed for threaded engagement with the threaded apertures 19.

In use, the connector is used to join together cables after these have been installed in position. Typically, the cables are 11kV power distribution cables and are relatively inflexible. Firstly, the end of one cable is inserted into the tubular second socket 14. The sleeve 24 is then drawn over the second socket 14, and the end of the other cable is passed through the slot 20 into the first socket 12. The sleeve 24 is then slid over the first socket 12, captivating the cable end within the first socket 12.

The plain apertures 26 in the sleeve 24 are then aligned with the threaded apertures 19, and locking bolts engaged with the threaded apertures 19. The locking bolts are tightened until they engage the end of the cable, thereby securing the cable to the internal wall of the first socket 12. The locking bolts may be normal bolts, or can be shear head bolts, the heads of which shear off once the cable is firmly secured to the socket and a certain predetermined applied torque is exceeded. Similarly, locking bolts are engaged with the threaded bores 18 in the second socket 14.

As can be seen from Figures 3 and 4, the longitudinal bores forming the first and second sockets

12,14 are offset from the centre of the connector. This increases the depth of the threaded bores 18,19 without increasing the amount of material in the connector, and hence its weight.

Referring now to Figures 5 to 7, a second embodiment of an electrical connector according to the invention is broadly similar to the first embodiment depicted in Figures 1 to 4, save that the slot 30 through which the cable end is inserted into the first socket is diametrically opposite to the threaded bores 32 which receive locking screws. In this case, the locking screws clamp the cable end to the internal surface of the sleeve, which is serrated to improve the electrical connection.

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### Claims

1. An electrical connector for the connection of two or more electrical conductors, the connector having a plurality of sockets, each of said sockets being adapted to receive an end of an electrical conductor, at least one of said sockets comprising a tubular member having a longitudinal slot through which the end portion of the conductor may be inserted laterally, and a sleeve member fitting, in use, around the tubular member, the tubular member and the sleeve member having corresponding apertures, an aperture in the tubular member and/or an aperture in the sleeve member being threaded so as to constitute a threaded bore with which a locking bolt may be engaged for securing the end portion of the electrical conductor to the tubular member or the sleeve member.
2. An electrical connector as claimed in claim 1, which has two sockets, one of which comprises a tube with one or more threaded bores to receive locking bolts.
3. An electrical connector as claimed in claim 1, which has three sockets, two of which comprise a tube with one or more threaded bores to receive locking bolts.
4. An electrical connector as claimed in any preceding claim, wherein the aperture in the tubular member is threaded and the aperture in the sleeve member is plain.
5. An electrical connector as claimed in any preceding claim, wherein the tubular member is part-cylindrical, the wall of the cylinder defining the longitudinal slot.
6. An electrical connector, wherein the longitudinal slot is formed in the wall of the tubular member at a position diametrically opposite to the aperture which receives the locking bolt.
7. An electrical connector as claimed in any one of claims 1 to 5, wherein the longitudinal slot is displaced from the axis of the locking bolt such that the locking bolt secures the conductor to an internal wall portion of the tubular member.

8. An electrical connector as claimed in any preceding claim, wherein the surface of the tubular member or the sleeve member to which the conductor is secured is provided with teeth or similar formations.

9. A method of connecting an electrical conductor to a connector as claimed in claim 1, wherein method comprises

inserting the end portion of the conductor laterally through the slot in the tubular member,

positioning the sleeve member around the tubular member,

locating a locking bolt in the threaded bore constituted by the apertures in the tubular member and/or the sleeve member, and

tightening the locking bolt so as to secure the end of the conductor to the tubular member or the sleeve member.

10. An electrical connector substantially as hereinbefore described and as illustrated in Figures 1 to 4.

11. An electrical connector substantially as hereinbefore described and as illustrated in Figures 5 to 7.



Application No: GB 9605134.7  
Claims searched: 1-11

Examiner: E. QUIRK  
Date of search: 14 May 1996

**Patents Act 1977**  
**Search Report under Section 17**

**Databases searched:**

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.O): H2E(EEGF,EEKD,EEKE,EEKH,EEZ)

Int Cl (Ed.6): H01R

Other:

**Documents considered to be relevant:**

Category	Identity of document and relevant passage	Relevant to claims
X,E	GB 2 294 597 A (Sicame) See Figures 4A,4B & 4C	1-6,9
X,P	GB 2 286 728 A (Sicame) See Figures 4A,4B & 4C	1-6,9
Y	GB 2 262 396 A (B&H) Whole Document	1-6,8,9
Y	GB 2 251 984 A (B&H) Whole Document	1-6,9
Y	GB 1 526 814 (S.E.P.M) See Figures	1-6,8,9
Y	WO92/11668 A1 (B&H) Whole Document	1-6,9

X Document indicating lack of novelty or inventive step  
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